

CLAIMS

1. A waterproof LED chain comprising:
 - a plurality of link units;
 - a plurality of wire pairs connecting the link units in electrical series;
 - 5 at least one wire pair connected to a link unit to form external power supply wires; each link unit comprising at least: a tray housing; a PCB securely received in the housing; a plurality of light emitting diode elements mounted on the PCB in electrical connection with the wire pairs at a wire pair connection point; and cured waterproof resin inside the tray housing encasing the printed circuit board, the wire pair connection point to the PCB and the lower half of the light emitting diode elements; wherein the cured waterproof resin inside the tray housing encasing the lower half of the light emitting diode elements forms a surface defining an outer cover sealing the opening of the tray housing to enclose the PCB, wherein the outer cover has a plurality of apertures corresponding to the number of said LED elements and the external power wires at the location where the LED elements and the external power wires protrude from the cured waterproof resin.
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2. The waterproof LED chain of claim 1, wherein said housing and said outer cover are made of PVC material.
3. The waterproof LED chain of claim 1, wherein a light-emitting portion of the diode elements protrudes outside the housing.
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4. The waterproof LED chain of claim 1, wherein a plurality of resistors is included in the electrical circuit for matching LED elements.
5. The waterproof LED chain of claim 1, wherein the LED elements are arranged in a linear configuration within each tray housing.
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6. The waterproof LED chain of claim 7, wherein each tray housing is rectangular in shape, and each PCB is rectangular in shape.
7. A waterproof LED chain made by the following steps:
 - a. soldering a plurality of LED elements at an LED bottom portion to a plurality of PCBs to create a plurality of prepared PCBs units, wherein at least a pair of LEDs are connected to each PCB,
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- b. soldering a plurality of wire pairs at the end of each PCB at wire connection points to form a continuous chain of prepared PCB units, each wire pair consisting of a positive and negative wire,
- c. placing a prepared PCB unit each having LED elements mounted on it into a tray housing, then pouring liquid epoxy resin into the tray sealing the wire connection points and bottom portion of the LED elements,
- d. curing the epoxy resin.
- 5 8. The waterproof LED chain of claim 7, further comprising the step of including a plurality of resistors in the electrical circuit for matching the voltage of LED elements.
- 10 9. The waterproof LED chain of claim 7, wherein the LED elements are arranged in a linear configuration within each tray housing.
10. The waterproof LED chain of claim 7, wherein each tray housing is rectangular in shape, and each PCB is rectangular in shape.
11. A waterproof LED chain comprising:
- 15 a plurality of link units;
- a plurality of wire pairs connecting the link units in electrical series;
- at least one wire pair connected to a link unit to form external power supply wires;
- each link unit comprising at least: a tray housing; a PCB securely received in the housing; a plurality of light emitting diode elements mounted on the PCB in electrical connection with the wire pairs at a wire pair connection point; and cured waterproof resin inside the tray housing encasing the printed circuit board, the wire pair connection point to the PCB and the lower half of the light emitting diode elements.
- 20 12. The waterproof LED chain of claim 11, wherein said housing and said outer cover are made of polycarbonate material.
- 25 13. The waterproof LED chain of claim 11, wherein the cured waterproof resin inside the tray housing encasing the lower half of the light emitting diode elements forms a surface defining an outer cover sealing the opening of the tray housing to enclose the PCB, wherein the outer cover has a plurality of apertures corresponding to the number of said LED elements and the external power wires at the location where the LED elements and the external power wires protrude from the cured waterproof resin.
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14. The waterproof LED chain of claim 7, wherein the LED elements are arranged in a linear configuration within each tray housing.
15. The waterproof LED chain of claim 7, wherein each tray housing is rectangular in shape, and each PCB is rectangular in shape.
- 5 16. The waterproof LED chain of claim 7, further including an electrical heat shrink cover formed as a tube fitted over the LED, which provides a watertight seal with the LED becoming integrally formed with the LED such that it becomes the bottom portion of the LED.